

Making the 5E Instructional Model Meaningful for Multilingual Learners

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STEM Leadership Practicum

NASA Endeavor STEM Teaching Certificate

1. Professional Development Project Title: Making the 5E Instructional Model Meaningful for Multilingual Learners.

2. Justification

As NYS has established that NGSS will start getting implemented in 2021 in high schools, our school needs to start getting ready for the transition to the New Generation Standards. In department meetings, teachers have shared that they are worried about the lack of resources and training that they have found regarding this transition.

To help our math and science teachers, the department of Curriculum & Instruction (of which I am the teacher leader) envisioned a series of PD's on this topic. As the head of the department, I led 3 PD's on the topic: introduction to the 5E model, scaffolds for English Language Learners and culturally responsive pedagogy.

3. School Name(s), Number of Educators, Grade Level(s)

Manhattan Bridges High School is a bilingual and dual-language school. There are currently 41 educators serving our population 100% composed of Latino students. Our school serves students from grade 9th to 12th through two different bilingual programs: a bilingual transitional program in which students in the 9th grade are mostly taught in Spanish; and they transition into English little by little as they move up to higher grades; and the dual-language program, that serves students of Spanish heritage; most of the times these are students who speak English outside the house, but Spanish at home.

The mission of Manhattan Bridges High School is to ensure that our Latino students learn the language at the same time that they meet the requirements of a rigorous curriculum. To make the curriculum relevant and rigorous, MBHS also offers two technical tracks for our students: the engineering track and the technology track. Through these partnerships, students are able to graduate with industry certifications besides their high school diploma. We also offer our students the bi-literacy seal, which proves that the student is proficient in both the Spanish and English Language.

4. Brief Summary of Project

I brought the idea of this PD to the Curriculum & Instruction Team, and everybody supported the idea of giving a PD to our staff integrating NGSS and 5E with a focus on Multilingual Learners. Our school has 72 minutes of PD built-in after school on Wednesdays, and the C&I Team (PD team) meets on Tuesdays to discuss upcoming PDs. The team decided that one day was not enough to cover all the important objectives, and therefore we divided the PD in three different days. The final plan of the project was as described below:

- **PD 1- Introduction to 5E.** - January 29th

Objectives:

- ❖ Deepen understanding of the 5E Instructional Model to support planning for instruction and assessment aligned with the NGSS

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- ❖ Using the 5E instructional model to develop a conceptual flow. Time to explore NASA 5E resources.

16 STEM teachers attended the first PD, and although most of them had a vague idea about NGSS, some of the teachers had never heard of the 5E Instructional Model.

PD sequencing:

We started the PD with a quick write:

How would you describe your classroom and the factors that guide your decisions about science teaching and learning?

How are these factors influenced by NGSS, 3D learning?

<https://www.nextgenscience.org/three-dimensions> Teachers were sitting in groups of 4 and shared their quick notes while they discussed the NGSS rubric.

During the PD, I introduced teachers to the ideas of Practices, Crosscutting Concepts and Core Ideas that we learned in the Endeavor class Methods of STEM. I played some of the short videos that we saw in “Methods of STEM”. These videos were “a vision for K-12 Science education” <https://learn.teachingchannel.com/video/next-generation-science-standards-achieve>, and” transitioning to NGSS” <https://learn.teachingchannel.com/video/transition-to-ngss-achieve>.

What are anchor phenomena? We watched “Using Phenomena in NGSS design” https://www.youtube.com/watch?v=Jyiv1Lc0dng&feature=emb_title. Before the video started, teachers predicted what “phenomena” means in science. After watching the video, they discussed: What are anchor phenomena? How are phenomena different from concepts?

After a round of questions, I used the 5E lesson plan that I developed for Methods of STEM, as an example,

https://docs.google.com/document/d/1pvkUb0TNWej90bv4ALv1b538fcAE7U_tBotVMoAqOlc/edit#heading=h.gjdgxs,

<https://docs.google.com/document/d/1OaCi1naa3-4Ub91feoxCkLpr1mcEJ1twbdIXg-aBtw/edi>

and I allocated some time for teachers to look at NASA resources.

<https://www.jpl.nasa.gov/edu/teach/resources/>.

Teachers had the opportunity to discuss the structure of the 5E model and to think about what lesson/topic they would like to transition to NGSS within their departments.

Some teachers had a clear idea of what was the best lesson for them to transition to NGSS, while others were still thinking of it.

Reflection Turn and Talk: What do you think will be your greatest challenges in planning lessons using the 5E instructional model? What are the similarities and differences between using the 5E model to guide your classroom practice and what you are doing now?.

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- **PD 2- Making content accessible to Multilingual Learners- - February 5th.**

Staff PD- 41 teachers attended the PD

Objective: Creating Scaffolds to help our Multilingual students access the 5E instructional model rigor.

At the beginning of the session, teachers complete a google form asking them about the scaffolds they currently use with Multilingual Learners, and what areas of differentiation they feel more comfortable using with MLs.

Teachers are asked to classify assessments they use with MLs in Low stakes or High Stakes assessments. Students discuss the difference between low and high stakes and decide when it is best to use each of them.

Teachers group by subject matter and decide what skill, and sub skill they would like to help their focus group develop, and decide what area (vocabulary, reading comprehension, paragraph writing they want to develop based on students' needs). To be able to select an appropriate area of focus, teachers look at available data (regents, school survey, students' survey...).

Teachers design a common strategy they will implement in their classrooms... The work will continue in departments.

- **PD 3- Culturally Responsive Pedagogy in STEM classes- February 26th**

Staff PD- 41 teachers attended the PD

Objective: Create culturally relevant experiences for our students framed in the 5E instructional model.

Teachers jot notes on: What does a culturally responsive classroom look like? What are the first words that come to you when you hear "culturally responsive"? Teacher discuss.

After that, the class is divided into teams. Each team reads a section of the Geneva Gay article "Preparing for Culturally Responsive Teaching" that we read in Methods of STEM. Link here <https://pdfs.semanticscholar.org/017d/5bcc2bce5f5652fd7fd813f1ae3a04c4569a.pdf>.

Teachers share the main points and create posters focusing on three questions:

- 1) What is culturally responsive teaching
- 2) What initiatives are we implementing in our classrooms that are culturally responsive?
- 3) Based on the reading, what other initiatives could we implement in our teaching practice to create a more culturally responsive classroom?

5. Reflection

I have been the head of the Curriculum & Instruction department for the past year. My responsibilities during this year included selecting meaningful PD for our staff, based on staff preferences and department and individual PD needs. Participating in the Endeavor program at the same time, opened my mind to a new set of needs that my school had in terms of

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addressing NGSS standards, making accessible the 5E instructional model for our Multilingual Students, and the awareness of culturally relevant pedagogy. It also offered me the possibility to access materials that I had not had previous access to before. Moreover, through the program, I had the opportunity of discussing NGSS standards with other teachers, and by creating and implementing several 5E model lessons myself in my classroom first, I became more proficient in the model and more confident of my ability to facilitate the model to other teachers.

Teachers had really great positive feedback after each of the PDs. In general, they thought that the PDs were meaningful and aimed to improve their instructional practice, they valued time to discuss NGSS standards with other teachers and to discuss new ways in which we can serve Multilingual Students better. This is some of the feedback I did receive:

BB: "I was able to make it relevant to my own classroom. Laura was great at ensuring everyone's voices were heard and the concerns and needs were addressed. We shared the wealth of our expertise".

JS: "Different variations of assessments, started talking more about writing and how to give timely feedback, resulted in the idea of self-assessment. Starting by scaffolding the expectations. First, start with some paragraphs and then pausing. Essays, projects, presentations, more 21st-century skills."

"FC: Last week I remember most of the teachers being engaged as DB showed particular "Big Questions" around assessment. I think that most teachers in MBHS see merit in teaching beyond Regents. I remember discussions around SAT skills, college placement exams, AP exams, and thinking about students developing skills to be proficient in critical thinking skills and skills that transfer on an interdisciplinary level."

MG: "great discussion, many different teachers shared, laughter/communal feeling, interesting to hear everyone's perspective the teachers brought up many great points and perspectives based on their subject areas, experiences etc"

DB: Thinking about the roles of students and teachers as separate. So thinking of it as a partnership. Helping build skills across classes so they can build social connections. Connecting what we teach to moral decisions."

MR: "The PD gave me the opportunity to think about NGSS assessments and to envision a plan for my next lesson on Electricity. It is the first time that I will face the 5E model myself, but it was really valuable to discuss how other teachers are using it in their practice "

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All in all, I think that one of the factors that contribute to the success of the PD series is the fact that I have been working with some of these teachers for 13 years, and we know and trust each other. Another factor was my level of expertise in the topic and my ability to be able to sequence the PDs in a coherent way. Lastly, the most decisive factor was how much the staff members at MBHS were willing to participate and contribute with their expertise to the PD series. One area of the improvement is the fact that time was not enough to cover all topics in depth. I am hoping to be able to continue the work we started this year during 2021 to support teachers in the transition to NGSS.

6. PD Attendees

Two teachers who attended the PD were:

-Pedro Placido. Engineering teacher 9-12th grade.

pplacido@manhattanbridgeshs.org (attended all three sessions)

-Richard Marmolejos- Global History Teacher 9-12th grade

marmolejos@manhattanbridgeshs.org (attended session 2 and 3)

7. References

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